

CLAIMS

1 1. A method of imaging a sample comprising:  
generating an ultrasonic signal;  
directing the ultrasonic signal into a sample;  
receiving any signal reflected by said sample,  
5 which signal is distorted and contains a first order  
and higher order component signals at first and higher  
frequencies respectively;

10 forming an image from one of said higher order  
component signals of the received distorted signal;  
and

displaying said formed image.

15 2. A method according to Claim 1, wherein the  
forming step includes the step of removing from the  
received distorted signal the first order component  
thereof.

20 3. A method according to Claim 2, wherein the  
removing step includes the step of high-pass filtering  
the received, reflected distorted signal to remove  
therefrom the first order component thereof.

25 4. A method according to Claim 2, wherein:  
the generating signal includes the steps of  
generating first and second ultrasonic signals;  
the directing step includes the steps of  
directing the first and second ultrasonic signals into  
the sample;

the receiving step includes the step of receiving  
any first and second signals reflected and distorted  
by said sample;

30 the forming step includes the steps of  
i) subtracting the received second distorted  
signal from the received first distorted signal to

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produce a resultant signal, and

1 ii) forming the image from said resultant signal.

5 5. A method according to Claim 4, wherein the first and second signals are identical except that one is scaled up in magnitude by a factor  $x$  (greater than 1) relative to the other and the second signal is transmitted after the reception of the distorted first signal.

10 6. A method according to Claim 5, wherein the sample (i) distorts the first ultrasonic signal to produce a first distorted signal, (ii) reflects the first distorted signal, (iii) distorts the second ultrasonic signal to produce a second distorted signal, and (iv) reflects the second distorted signal.

15 7. A method according to Claim 6, wherein the forming step includes the step of:

scaling the smaller received distorted signal (corresponding to the unscaled transmitted signal) by the previously used scale factor  $x$ ;

20 next subtracting this scaled signal to produce a difference signal essentially without frequency content in the original transmitted bandwidth; and

forming the image from one of said higher order component signals of the difference signal.

25 *Sub a2* 8. A method according to Claim 1, wherein said higher order component signals includes a second order component, and the forming step includes the step of forming the image from said second order component.

30 9. A method according to Claim 1, wherein the generating step includes the step of generating a series of ultrasonic pulse signals.

*Sub a3* 10. A method according to Claim 1 wherein the

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1 directing step includes the step of maintaining the  
sample substantially free of any contrast agent not  
naturally present in the sample.

11. A method according to Claim 1, wherein the  
sample is a biological sample.

5 12. A system for imaging a sample comprising:  
means for generating an ultrasonic signal;  
means for directing the ultrasonic signal into a  
sample;

10 means for receiving any signal reflected by said  
sample, which signal is distorted and contains a first  
order and higher order component signals at first and  
higher frequencies respectively;

15 means for forming an image from one of said  
higher order component signals of the received  
distorted signal; and

20 means for displaying said formed image.  
sub 94 13. A system according to Claim 12, wherein the  
means for forming the image includes means for  
removing from the received distorted signal the first  
order component thereof.

25 14. A system according to Claim 13, wherein the  
means for removing the first order component from the  
received distorted signal includes a high-pass filter  
to filter the received, reflected distorted signal to  
remove therefrom the first order component thereof.

15. A system according to Claim 13, wherein:  
the means for generating the ultrasonic signal  
includes means for generating first and second  
ultrasonic signals;

30 the means for directing the ultrasonic signal  
into the sample includes means for directing the first

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and second ultrasonic signals into the sample;

1 the receiving means includes means for receiving  
any first and second signals reflected and distorted  
by said sample;

the means for forming the image includes

5 i) means for subtracting the received second  
distorted signal from the received first distorted  
signal to produce a resultant signal, and

ii) means for forming the image from said  
resultant signal.

10 16. A system according to Claim 15, wherein the  
first and second signals are identical except that one  
is scaled up in magnitude by a factor  $x$  (greater than  
1) relative to the other and the second signal is  
transmitted after the reception of the distorted first  
15 signal.

17. A system according to Claim 16, wherein the  
sample (i) distorts the first ultrasonic signal to  
produce a first distorted signal, (ii) reflects the  
first distorted signal, (iii) distorts the second  
20 ultrasonic signal to produce a second distorted  
signal, and (iv) reflects the second distorted signal.

18. A system according to Claim 16, wherein the  
forming means includes:

25 means for scaling the smaller received distorted  
signal (corresponding to the unscaled transmitted  
signal) by the previously used scale factor  $x$ ; and

next for subtracting this scaled signal to  
produce a difference signal essentially without  
frequency content in the original transmitted  
30 bandwidth; and

means for forming the image from one of said

higher order component signals of the difference  
1 signal.

5 *sub A5* 19. A system according to Claim 12, wherein said  
higher order component signals include a second order  
component, and the means for forming the image  
includes means for forming the image from said second  
order component.

10 20. A system according to Claim 12, wherein the  
means for generating the ultrasonic signal includes  
means for generating a series of ultrasonic pulse  
signals.

15 *sub A6* 21. A system according to Claim 12, wherein the  
sample is substantially free of any contrast agent not  
naturally present in the sample.

22. A system according to Claim 12, wherein the  
sample is a biological sample.

20 *Add A7*

25 *Add B3*

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